

Monthly Marine Biotoxin Report December 2009

Technical Report No. 09-29

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of December, 2009. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

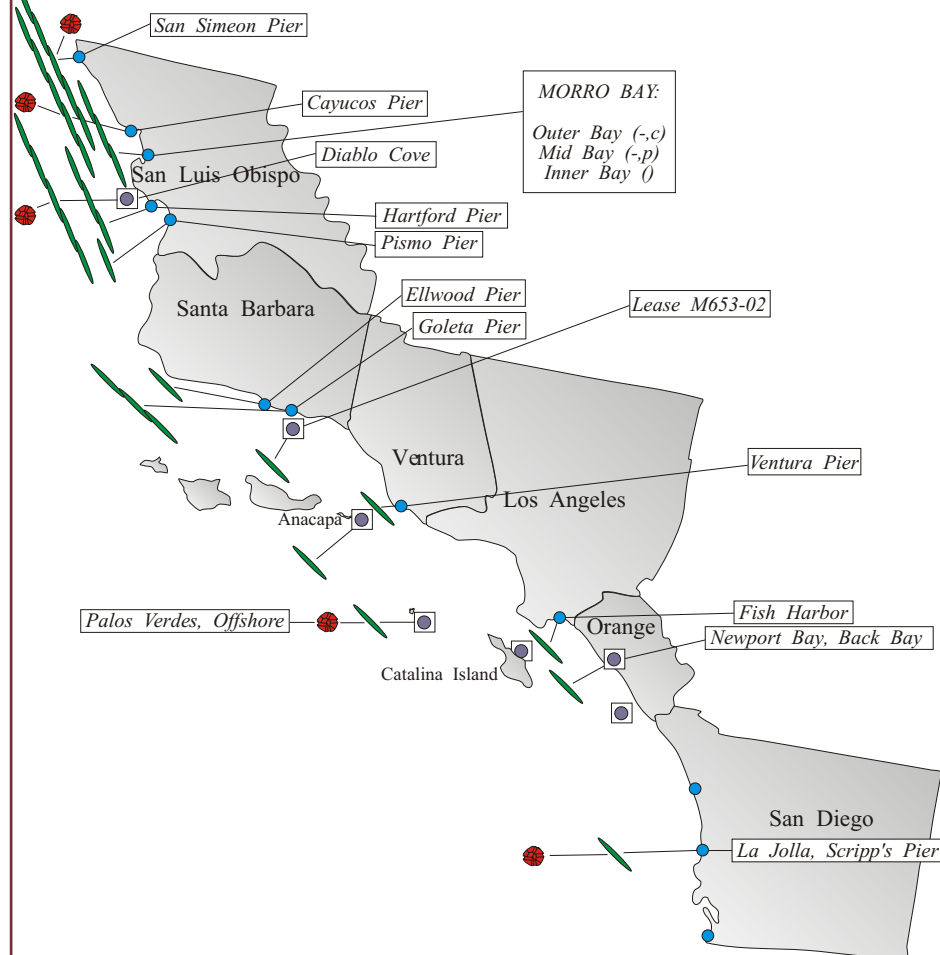
Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several sampling locations during December (Figure 1). Low numbers of this dinoflagellate were detected at several sites in San Luis Obispo County, offshore of Palos Verdes (Los Angeles

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during December, 2009.



Relative Abundance of Known Toxin Producers

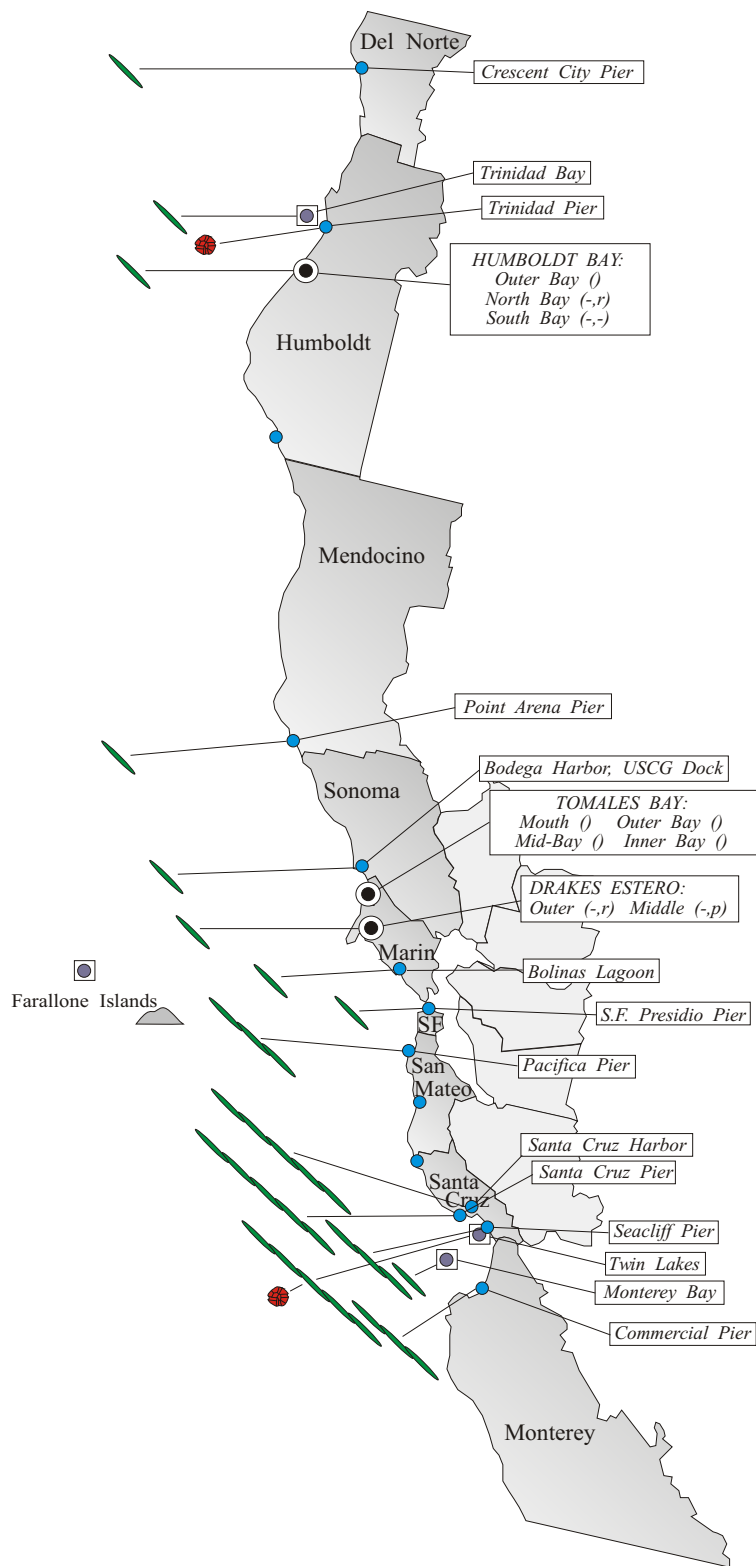
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during December, 2009.



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County), and at Scripp's Pier (San Diego County).

A low concentration of the PSP toxins was detected in a sample of rock scallop viscera collected from a platform offshore of the Santa Barbara-Ventura county line on December 5 (Figure 3).

Domoic Acid

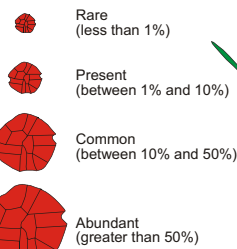
Pseudo-nitzschia was detected at many locations, covering most southern California coastal counties, during December (Figure 1). The relative abundance of this diatom increased again at several sites along the San Luis Obispo County coast, following an initial decline in November. This significant increase in *Pseudo-nitzschia* numbers occurred during the first week of December, declining steadily through the remainder of the month. The highest relative abundance of *Pseudo-nitzschia* was observed at Cayucos Pier (San Luis Obispo County) on December 1.

Low levels of domoic acid were detected in shellfish samples collected from two locations in Morro Bay during the first week of the month (Figure 3). Sentinel mussels collected on December 1 inside Morro Bay contained 14 ppm of domoic acid. All subsequent samples were below the detection limit for this toxin.

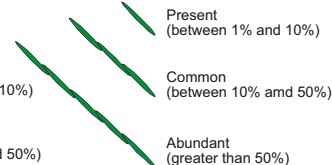
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Relative Abundance of Known Toxin Producers

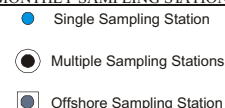
Alexandrium Species



Pseudo-nitzschia Species



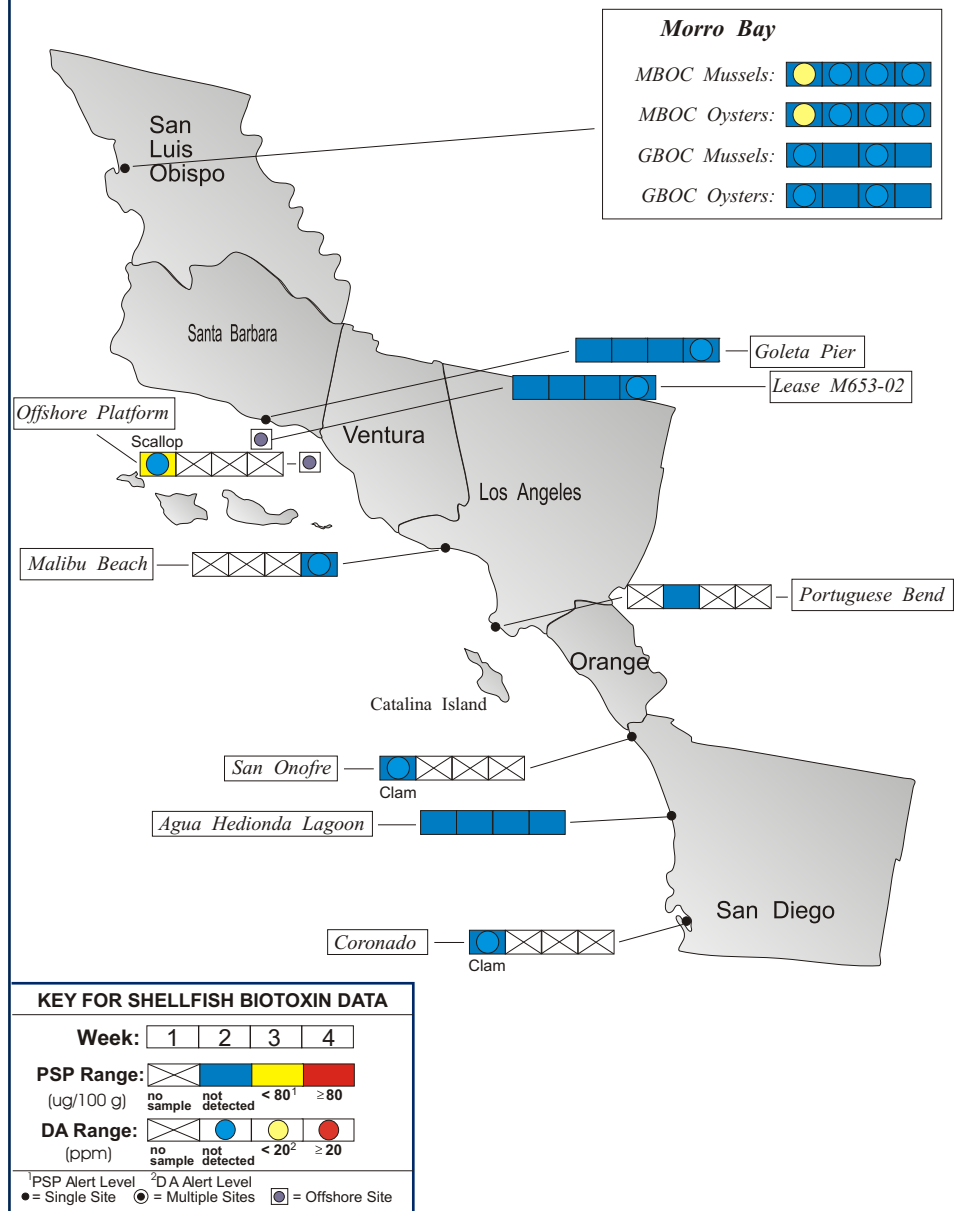
MONTHLY SAMPLING STATIONS:



For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during December, 2009.



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Non-toxic Species

Dinoflagellates continued to dominate the phytoplankton assemblage along the southern California coast. The most abundant species continued to be *Lingulodinium polyedrum*, *Ceratium furca*, and *Prorocentrum micans*. The diatom *Chaetoceros* was also common at many sites along the southern California coast towards the end of the month.

Northern California Summary:

Paralytic Shellfish Poisoning

Low numbers of *Alexandrium* continued to be observed at sites in Humboldt and Marin counties in December (Figure 2). These observations represent a continuing decrease in distribution compared to observations in previous months.

PSP toxins were not detected in any shellfish samples collected in December (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at most sampling locations in December (Figure 2). The high relative abundance of this diatom observed at sites inside Monterey Bay in October and November persisted into December at some sites and declined at

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:
(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553-4133

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others. The highest relative abundances were observed during the second and third weeks of the month.

Domoic acid was not detected during the first week of December, then began slowly increasing during the second and third weeks of the month. By December 22 the concentration of domoic acid had exceeded the alert level in sentinel mussels from Santa Cruz Pier, reaching 24 ppm. A low concentration of domoic acid was also detected in a mussel sample from the commercial pier in Monterey (December 14).

Non-toxic Species

Diatoms dominated the northern California coast in December. *Chaetoceros* was the most abundant genera observed, although *Coscinodiscus* was common at sites between Marin and San Mateo counties.



QUARANTINES:

The annual mussel quarantine extension remained in effect for Del Norte, Humboldt, and San Luis Obispo counties due to elevated toxin levels in these regions. The health advisory issued in October for Santa Cruz County as a result of high concentrations of domoic acid also remained in effect. There were no quarantines or health advisories in place for the remainder of the coastal counties in November.

The annual quarantine goes into effect each year on May 1 and applies specifically to the sport-harvesting of mussels along the entire California coastline, including all bays and estuaries. Routine phytoplankton and biotoxin monitoring is maintained

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Figure 4. Distribution of shellfish biotoxins in Northern California during December, 2009.

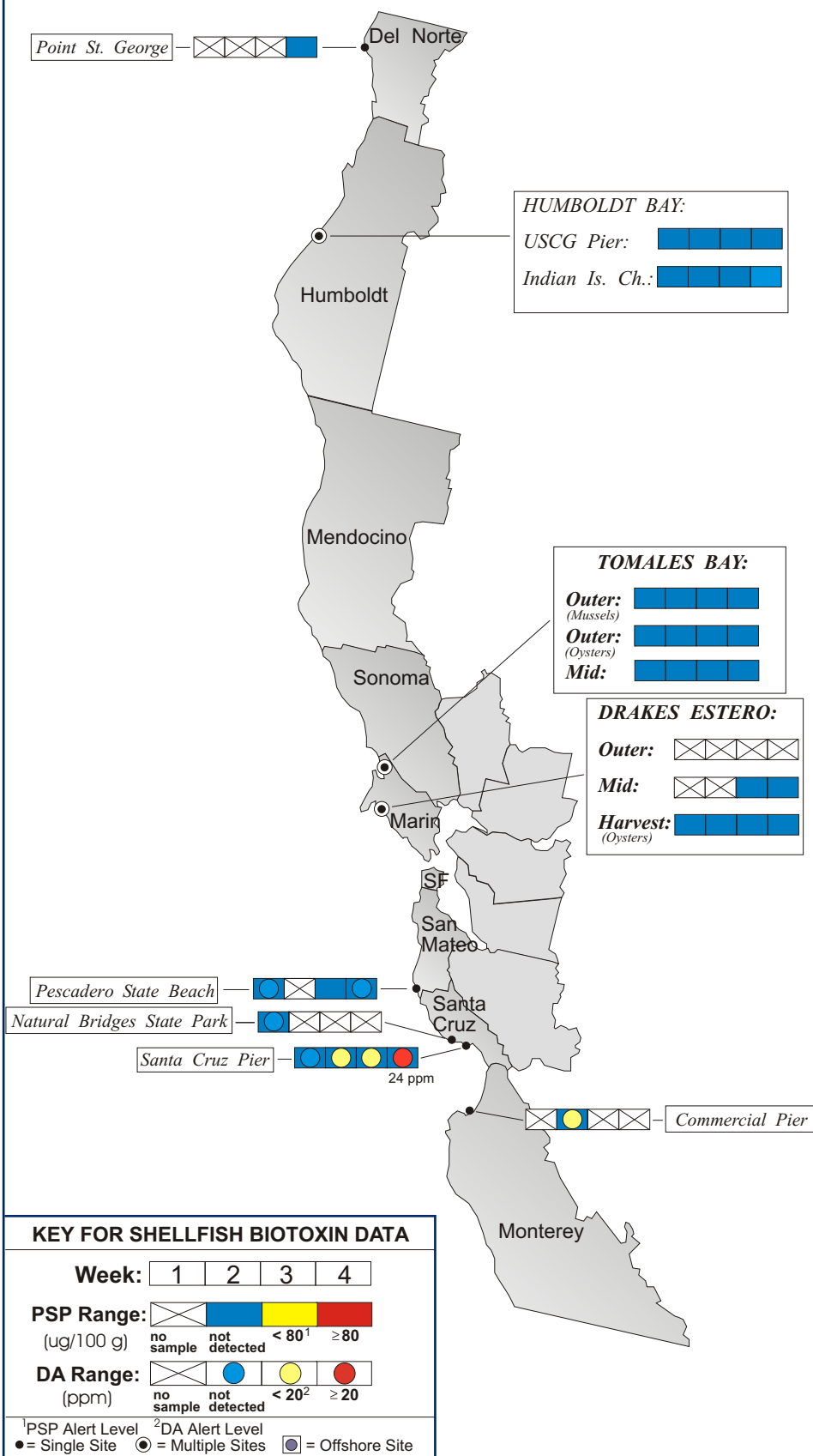


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during December, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	8
Mendocino	None Submitted	
Sonoma	None Submitted	
Marin	Cove Mussel Company	2
	Drakes Bay Oyster Company	20
	Hog Island Oyster Company	4
	Marin Oyster Company	3
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	3
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	1
Monterey	Monterey Abalone Company	1
San Luis Obispo	Grassy Bar Oyster Co.	8
	Morro Bay Oyster Company	12
Santa Barbara	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	5
Ventura	CDPH Volunteer (<i>Bill Weinerth</i>)	1
Los Angeles	Los Angeles County Health Department	2
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	5
	CDPH Volunteer (<i>Bill Weinerth, Island Packers</i>)	2

throughout the year. This allows the detection of unexpected increases in biotoxin activity outside of the routine quarantine period. The annual quarantine does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively throughout the year. All certified shellfish growers are required to submit at least weekly samples of shellfish for toxin monitoring. Harvest restrictions or closures are implemented as needed to protect the public's health.

Consumers of Washington clams, also

known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the

viscera.

PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

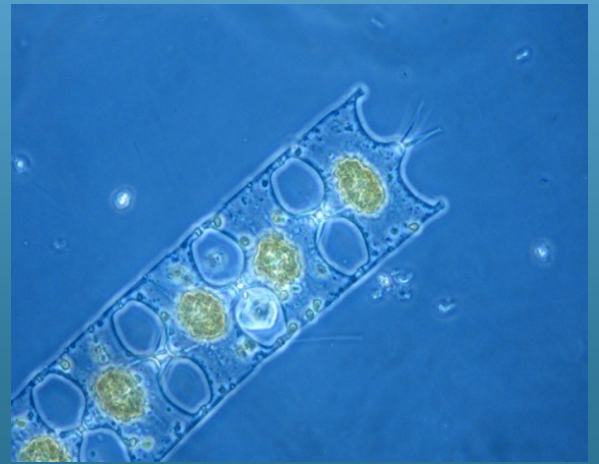
Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.



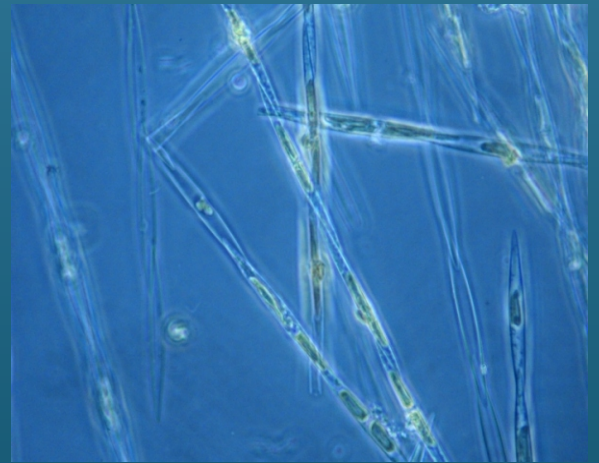
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during December, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	3
Humboldt	Coast Seafood Company	5
	Bureau of Land Management	3
	CDPH Volunteers (<i>Nick Fernello</i>)	1
	Fortuna High School	1
	Humboldt State University	1
Mendocino	CDPH Volunteer (<i>Marie De Santis</i>)	2
Sonoma	None Submitted	2
Marin	CDPH Volunteers (<i>Brent Anderson</i>)	5
	Drakes Bay Oyster Company	11
San Francisco	CDPH Volunteer (<i>E. McNaughton</i>)	4
San Mateo	CDPH Volunteer (<i>Kathleen Abadie</i>)	1
	Friends of the Sea Otter (<i>Diane Larsen</i>)	1
	San Mateo County Environmental Health Dept.	3
	The Marine Mammal Center (<i>Stan Jensen</i>)	2
	U.C. Santa Cruz	1
Santa Cruz	California Department of Parks and Recreation	2
	San Lorenzo Valley High School	3
	The Marine Mammal Center (<i>Nancy Scarborough</i>)	2
	U.C. Santa Cruz	5
Monterey	Monterey Abalone Company	3
	Marine Life Studies	1
San Luis Obispo	Friends of the Sea Otter (<i>Kelly Cherry</i>)	5
	Morro Bay National Estuary Program	1
	Monterey Bay National Marine Sanctuary	5
	Morro Bay Oyster Company	4
	Tenera Environmental	2
	The Marine Mammal Center (<i>Tim Lytsell, P.J. Webb</i>)	6
Santa Barbara	CDPH Volunteer (<i>Sylvia Short</i>)	5
	National Park Service	2
	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	5
Ventura	CDPH Volunteer (<i>Fred Burgess</i>)	3
	National Park Service	1
Los Angeles	Los Angeles County Sanitation District	3
	Southern California Marine Institute	1
Orange	California Department of Fish and Game	4
	Ocean Institute	1
San Diego	Avian Research Associates	2
	Carlsbad Aquafarms, Inc.	1
	Scripps Institute of Oceanography	4

PHYTOPLANKTON GALLERY



The diatom *Odontella* is often present as a minor component of the phytoplankton assemblage.



Pseudo-nitzschia remained common to abundant at sites in Monterey Bay and San Luis Obispo.



The dinoflagellate *Ceratium macroceros* continued to be observed in samples from offshore of southern California.